3.3 PLANTS/WETLANDS

3.3.1 Affected Environment

A variety of vegetative communities and habitat types are present on the project site. The existing vegetation conditions in the interior portions of the site are limited by soil conditions and water patterns, as described below.

3.3.1.1 Soils

The existing soils within the interior portions of the project site are not parent material but are modified materials resulting from grading, filling, construction and demolition activities occurring on the Sand Point peninsula since the early 1900s. Field investigations for wetlands work determined that existing soils, in all portions of the project site examined, were comprised of fill material. Anecdotal information from Sand Point Magnuson Park staff indicates that the former bluff at Sand Point Head and the northern portions of Promontory Point were cut and graded to provide the fill material used to eliminate Mud Lake and the wetlands, fill lake bays and expand the shoreline of the original peninsula. Field sampling has shown soils to be variable, but consistently concretious in nature (i.e., so hard as to be impermeable in many instances, even with mechanical post-hole diggers). Soil types encountered in sampling include cobble, gravely sands, sandy gravelly cobble, and gravelly silts. Almost all soils on the site have a very low permeability (as evidenced by extensive surface ponding and no infiltration below the top 4 inches, even after heavy storm events). Most soils currently reflect hydric conditions of low chroma and the presence of redoximorphic features (mottles) within the top 10 inches.

3.3.1.2 Hydrology

The hydrology of the site is driven by precipitation. Flat gradients, shallow ditches with little gradient, and impermeable soils create the opportunity for precipitation to stand within shallow depressions and pond for the duration of the winter. Because of the lack of significant soil infiltration, shallow depressions of a few inches to 18 inches in depth are typically filled with the first fall storms and remain full through early to mid-spring.

Ditches that were created after the removal of the airfields in the 1970s are present across the interior of the site. These ditches convey stormwater flows from the interior of the site to Lake Washington via a series of culverts under the road system of the park. After mid-spring, the ditches typically remain dry until the fall rains return.

Groundwater studies conducted in 1999 documented groundwater conditions across the site (AMEC Earth & Environmental, Inc., 2000). The groundwater level varies seasonally, although it is also strongly influenced by infiltration and hydraulic head from the hills of View Ridge, to the west. Some groundwater wells installed by the Navy have experienced artesian water conditions, allowing upwelling of groundwater along the western margins of the existing interior portion of the site. In addition to the artesian influences, the reverse hydrology of Lake Washington (as controlled by the Hiram M. Chittenden Locks) affects the groundwater level immediately within the shoreline zone causing it to be approximately 2 feet higher in summer than winter.

3.3.1.3 Plant Communities

As noted in **Section 2.1**, the land uses on the site since the early 1900s have strongly influenced existing conditions. The existing vegetation communities on site are all early-successional stages of upland and wetland habitats that are less than 30 years old, with the exception of the forests on Promontory Point. Soils are severely compacted and missing major organic components, including detritus. Hydrology is driven by precipitation and winter ponding on the compacted soils. The somewhat extreme soil conditions on site strongly influence the site hydrology and therefore the plant communities present.

Upland Community Types

The following upland vegetation community type descriptions were used in the Sand Point Magnuson Park Vegetation Management Plan (Seattle Department of Parks and Recreation, 2001); they are used here for consistency. (Wetland communities are described subsequently in **Section 3.3.1.4**)

- Mowed grasslands: these are regularly maintained lawns near the swim beach area, surrounding the existing tennis courts, and at the Sand Point and Magnuson Park grass sports fields. They are 100 percent non-native turf/lawn grasses managed for high-use activities.
- Upland meadow: these are unmowed or infrequently mowed grasslands with native and non-native grasses comprising the dominant species. They are present within the interior portions of the habitat area, north of the Fin Art display, and within some portions of the shoreline zone. The grasses in these areas are mowed only in the fall, and they are not always mowed annually.
- Savannah: these are open expanses of meadow with scattered native or non-native trees and shrubs (note that the woody species do not form a closed canopy, but are groves or thickets of vegetation surrounded by unmowed grasslands). Savannah is present within the interior portions of the site, near the base of Kite Hill, and near the boat launch parking lot. Tree species may include Lombardy poplar, black cottonwood, hawthorne and Oregon ash. Shrubs can include Scot's broom, blackberry, spirea, upland willows and madrone.
- Non-native shrub thickets: these areas are comprised of dense stands of Himalayan blackberry or stands of Scot's broom, often in 100-percent homogenous stands. They are scattered throughout the site, with the Scot's broom thickets more common on and near Kite Hill, while blackberry thickets are found throughout the site. In addition, blackberry are found as single plants along forest and woodland margins where it may not be dense enough to qualify as 'thicket.'
- Non-native trees: Lombardy poplar stands may include white poplar and hybridized cross-bred poplars. Lombardy poplar was planted on the site several decades ago in a typical "allee" manner, as a boulevard tree along the former NOAA access road, near the Community Activity Center, and near the existing tennis courts. It is a highly invasive species, colonizing by root clones radiating out from the parent trees.
- Deciduous forest: this is a mixed-canopy forest, dominated by big-leaf maple and red alder. Some planted young conifers may be present but they do not represent a notable habitat feature at this stage. This habitat predominates at Promontory Point. The forest includes invasive non-native species such as English ivy and virgin's bower, which are found in extensive swaths in some places while other portions of the forest are not overwhelmed by these invasive species.

Wetland Community Types

Human activities on the site over the last 30 years have also strongly influenced the extent, species composition and functions of the existing wetlands. Due to the impervious nature of the soils and the relatively flat gradients, the majority of the interior habitat zone of the site is a mosaic of both upland and wetland communities. No wetland delineation was attempted on the interior acreage because of the totally random pattern of wetland and upland habitats. Where wetlands are clearly and discretely present (as in all ditches on the site, some forested stands and most shallow depressions, such as the feature known as Frog Pond), they have been mapped and described. In the majority of the interior of the site, the extent of wetland presence has been estimated based on extensive field work, data plot collection and vegetation community mapping. Informal discussions were held with federal regulatory staff, who concurred with the view that in these conditions the extent of wetland area (as expressed by the percent coverage of wetland within a defined acreage) can be best estimated by linking observed soil conditions with vegetation. When it is appropriate to prepare a permit application for the proposed project, a more detailed wetland assessment will be conducted using a protocol agreed to by the City and federal agency regulatory staff. The EIS analysis employed a conservative approach of identifying 40 percent of the gross area of upland/wetland mosaic as wetland acreage, rather than trying to differentiate wetland from upland areas within this mosaic.

Four existing wetland community types have been identified within the project area and are described below; acreages cited are conservative estimates (i.e., they are likely overstated):

- Wet meadows: there are approximately 8.4 acres of wet meadow habitat on the project site. **Figure 3.3-1** shows the approximate extent of the wet meadow/upland meadow mosaic; based on field observations and aerial photo interpretation, it is assumed that 40 percent of the indicated gross area (about 21.1 acres) is actually wetland. Various moisture-tolerant grasses and Baltic rush dominate the wet meadow community. Small patches of reed canary grass are present. These meadows constitute the largest existing vegetation community type on the project site.
- Emergent marshes: there are approximately 3.1 acres of emergent marsh (shown as PEM – palustrine emergent in **Figure 3.3-1**) on the project site. These areas are generally characterized as having longer-term inundation into the growing season, a higher plant species diversity and more wet-tolerant species than the wet meadows, and generally have 4 to 18 inches of standing water into the spring. Species present include various native sedges, spikerush, native wet grasses and bulrushes. Frog Pond and several small closed depressions south of it are included in this wetland type. In addition, there is marsh habitat just north of NE 65th Street, both east and west of Sportsfield Drive. Some of these marshes are ringed with native shrubs and sapling-stage trees, although they have been mapped as emergent communities because that is the dominant vegetation type present.
- Shrub wetlands: approximately 8.3 acres of willow/spirea shrub wetlands with interspersed emergents (shown as PSS – palustrine shrub/scrub and PEM/PSS in **Figure 3.3-1**) are present on the site. Willows dominate along most of the ditches that traverse the site, with smooth rush, reed canary grass and various other wet grasses present amidst the shrubs. Willows also dominate the "outlet channel" that empties into Lake Washington at a location just north of the boat ramp, with yellow iris and purple loosestrife present in the understory. Near the south toe of Kite Hill is a mixed community of sedges and spirea, with the sedges forming a distinct vegetation type but the spirea dominating the overall coverage (i.e., the sedge stand is too small to map at this scale).

Figure 3.3-1
Existing Vegetation Community Types
(copy SK2.2 from Appendix A)

- Forested wetlands: there are approximately 2.7 acres of forested wetlands (shown as PFO – palustrine forest in **Figure 3.3-1**) on the project site. These are generally black cottonwood stands with little or no understory present (some may have sparse spike rush). The trees tend to be the same age class and the closed depressions tend to pond water up 6 to 8 inches deep over the winter.

3.3.1.4 Wetland Functions: Existing Conditions

The tool used to estimate wetland functions on-site is the modified Reppart or SAM (Semi-Quantitative Assessment Method) functional assessment (Cooke, 2000). Copies of completed data forms for the existing wetlands on the site are provided in **Appendix C** (Exhibits C1 through C3). As noted above, no formal wetland delineations have been conducted on the site; therefore, acreage estimates for the wetland functional assessment are based on a conservatively estimated 'typical' wetland patch size on site of 1.0 acre for the wet meadow/emergent communities, 2 acres for the shrub communities and 0.25 acres for the forested communities. The size estimates are based on extensive field work that has confirmed the patchy mosaic of habitat types across the site. **Table 3.3-1** summarizes the findings of the functions provided for each wetland vegetation type assessed. The numbered rating for each category has been converted to a high, moderate, or low rating. The scoring breakdown for each category is as follows:

High = 75-100 percent of the maximum possible score
Moderate = 50-74 percent of the maximum score
Low = <50 percent of the maximum score

The maximum score for a function is not split into thirds equally for this breakdown because the minimum score for each variable is 1, rather than 0. If the lowest score (Group 1 on the assessment forms) is awarded for each variable evaluated for a function, that function will score one-third of the maximum points. Under a normal distribution, a function with three variables checked in the Group 1 column of the assessment form and one in the Group 2 column would be incorrectly rated moderate rather than low. Skewing the distribution toward the high end more accurately reflects the overall score for each function. **Table 3.3-1** summarizes the nine functions identified in the Semi-Quantitative Assessment Method, the maximum score possible for each function, and the scores calculated for each wetland.

Based on the SAM functional assessment method, the wetland types on site generally rate low to moderate for all functions. Only the forested wetlands rate higher than the other two vegetation types, and only for the function of flood/stormwater control, as the model assumes forested systems assist in flood control more effectively due to the presence of the trees. For the functional assessment it was assumed that the following parameters applied: wetlands were located in the lower 1/3 of their basins; the buffers around these wetlands were moderately intact; and the wetlands were all strongly linked to upland habitats. The buffer disturbance assumption was based on the lack of woody vegetation communities in most existing buffers.

The wetland types on site rate low for specific habitat functions because of their lack of structural and species diversity, although their link to upland habitats and their connectivity to vegetated buffers cause them to rate moderate (barely) for overall habitat functions and natural biologic support.

Table 3.3-1
Existing Wetland Functions

Wetland Function	Emergent Wetland	Shrub Wetland	Forested Wetland
Flood/Storm Water Control	L	L	M
Base Flow/Ground Water Support	L	L	L
Erosion/Shoreline Protection	NA	NA	NA
Water Quality Improvement	M	M	M
Natural Biological Support	M	M	M
Overall Habitat Functions	M	M	M
Specific Habitat Functions	L	L	L
Cultural/Socioeconomic Functions	L	L	L

3.3.1.5 Threatened, Endangered and Sensitive Plant Species

As documented in a letter (November 26, 2001) from the Washington Department of Natural Resources (WDNR), no documented rare plants or high-quality ecosystems occur in the project vicinity. Documentation by others that a state-listed orchid, western ladies tresses, (*Spiranthes romanzoffiana var. porrifolia*) is to be found on the site (Seattle Urban Nature Mapping Project, 1999/2000) is in error. The orchid species present on the project site is in fact the hooded ladies tresses (*Spiranthes romanzoffiana var.romanzoffiana),* which bears a strong resemblance to the state-listed species. According to staff at the Natural Heritage Program of the WDNR (J. Gamon, personal communication, WDNR Natural Heritage Program, Olympia, Washington, August 1, 2001[DMS1]unication), hooded ladies tresses is a common species most often found on very disturbed sites, whereas western ladies tresses is not found in those conditions. The orchid is found at Sand Point Magnuson Park near the Off-Leash Area in soils that are severely compacted.

3.3.2 Environmental Impacts of the Proposed Action

Implementation of the proposed action would have a variety of effects, both positive and negative, on the existing vegetation communities on the project site. The array of effects includes short-term impacts that would occur during the project construction period and long-term impacts that would occur over time after the project is completed. The short- and long-term impacts could include both direct and indirect effects.

3.3.2.1 Short-Term (Construction) Impacts

Existing vegetation on sizable portions of the project site would be removed during clearing and grading operations in a phased sequence over approximately a 10-year period. This would occur in virtually the entire area to be developed for the sports field complex, as well as in the expansion area for the Kite Hill/Beach drive parking lot, two realigned segments of Beach Drive, the margins of the NE 65th Street right-of-way, and the routes for the various pedestrian pathways included in the proposed action. These features of the proposed action collectively account for approximately 90 acres of future project uses on the site (per **Table 2.2-1**), although not all of this area is currently vegetated. In addition, development of the wetland/habitat complex and site drainage features would require clearing existing vegetation over a substantial additional acreage to allow construction of water quality ponds, bioswales, berms and wetland ponds. Approximately 126 acres of the 153-acre project site are currently vegetated. As a reasonable approximation, it is likely that 50 to 65 percent of the existing vegetation on the project site (roughly 60 to 80 acres) would be cleared at some time during the construction period to allow development of the proposed features. Some minor additional acreage of existing vegetation would remain in place but would be disturbed during construction, primarily through construction vehicle traffic and/or temporary storage of construction materials. Where possible and appropriate, the plan retains the most complex existing wetland habitats and stands of native trees (both wetland and upland habitat) that could best contribute to the function of the wetland/habitat complex.

Because the project would be constructed in phases, vegetation clearing would be confined to a portion of the project site at any given time during the construction period. Because the areas cleared in construction would be resurfaced within a relatively short period of time (by the end of a construction phase), the short-term effects on existing vegetation are of less significance than the longer-term consequences of converting existing vegetation to other uses or cover types (which is discussed in **Section 3.3.2.2**).

3.3.2.2 Long-Term Direct Impacts

The long-term direct impacts of the proposed project on existing vegetation communities are those associated with replacement of current vegetation with alternative uses or cover types. In broad terms, the existing vegetation communities on the site could be:

1. converted to developed park uses such as sports fields, service/maintenance facilities, parking lots, roadways or trails;
2. left generally as is;
3. enhanced to provide increased habitat or recreational value; or
4. converted to another natural cover type that would better attain the project objectives for increased wetland/habitat values.

As indicated previously, approximately 90 acres of the project site would be allocated to developed park uses (sports fields, park lawn and planting, buildings, roads, paths and parking) upon completion of construction. Much of this acreage is already occupied by existing sports fields, paved surfaces and mowed grasslands, while much is also within the unprogrammed open space or "habitat zone" of the park. **Figure 3.3-2** shows the relationship between proposed developed uses of the project site and existing habitat areas.

Figure 3.3-2
Existing Habitat Displaced by Development, Proposed Action

In terms of general vegetation changes, the conversions associated with the proposed developed uses can be summarized as follows:

- The area of the proposed sports meadow currently consists primarily of mowed grasslands at the location of the existing Magnuson Park fields. A variety of more-natural upland (primarily) and wetland cover types occur along the margin of the existing sports meadow, which would be expanded for the proposed action.
- Most of the 35 to 40 acres in the western part of the project site that would host the synthetic-turf sports fields and associated facilities is either already in developed use or in previously disturbed areas of low habitat value. The area proposed for development as Fields 7, 11, 12, 13, 14 and 15 is currently occupied by mowed grasslands (the existing Sand Point fields), existing paved areas, existing buildings (the former Navy Commissary complex), and unprogrammed open area between the buildings and the sports fields. Fields 5, 6, 8 and 9 and a portion of Field 10 (the northeastern quadrant of the synthetic-turf field area) extend into the interior area of the project site that currently supports a mixture of more-natural upland and wetland vegetation types, primarily wet meadow.
- Virtually all of the 8.7 acres to be developed for parking use under the proposed action are currently in developed use. The proposed North Sand Point parking lot is the site of an existing parking lot. Existing sports fields or unprogrammed grassland are presently found on the sites proposed for the North Fields and Sportsfield Drive parking lots. The site of the proposed South Fields parking lot currently is occupied by part of the Commissary building, another support building to the west of the Commissary, and part of the large parking lot between the two structures. The proposed Kite Hill/Beach Drive parking lot is the only lot that would displace a measurable area of higher-value habitat. Approximately two-thirds of the site for this facility consists of the existing beach area parking lot, while the proposed expansion area extends into savannah vegetation near the base of Kite Hill.
- Virtually all of the 4.6 acres to be used for roadways under the proposed action are currently in that same use. The primary exceptions to this condition are the two segments of Beach Drive, totaling about 1,200 to 1,500 lineal feet, which would be relocated in conjunction with pond and lagoon development in the wetland/habitat complex.

In summary, the developed park uses included in the proposed action would displace a relatively small amount of existing vegetation that currently functions as habitat. The most noteworthy example of long-term habitat loss would be the displacement of wet meadow and interspersed upland habitat in the northeastern quadrant of the synthetic-turf sports field area. This impact is addressed more specifically below.

Development of the new sports field complex would result in the elimination of approximately 1.5 acre of existing upland and a total of 9.9 acres of existing wetland on the west side of the project site. The affected wetland area includes 9.3 acres (gross area) of wet meadow and 0.6 acres of willow/spirea shrub wetland habitat. Wetland loss would result from the direct placement of fill in existing wet meadows to construct athletic fields and associated facilities, and from 1.6 acres of upland planting. These existing wetlands are dominated by herbaceous vegetation such as smooth rush and Baltic rush, plus patches of native and non-native (blackberry) thicket. Elimination of existing structures and related impervious surface area elsewhere on the project site would allow the creation of over 11 acres of wetland vegetation communities and upland planting.

In addition to conversion of existing vegetation communities associated with construction of the sports fields and other developed park uses, there would be relatively extensive vegetation changes occurring in the wetland/habitat area of the project site. Based on interpretation of the existing wetland and upland communities on the site that are likely to provide substantial habitat value and the size of the proposed wetland/habitat complex, the proposed action would result in a net increase of over 11 acres of functioning wildlife habitat. Total wetland acreage on the project site would increase by 8.5 acres compared to existing conditions. In addition, the habitat values of the wetland and upland communities that would remain or be created on the site would increase as a result of the quality and diversity of the habitat components that would be provided. These changes in wetland values are discussed in **Section 3.3.2.4**, while wildlife habitat values of upland communities are addressed in **Section 3.4.1.2**.

3.3.2.3 Long-Term Indirect Impacts

Water Quantity and Quality

Implementation of the proposed action could indirectly affect post-construction upland and wetland communities in a variety of ways. In the case of wetlands, two of the primary means of potential indirect impacts are through changes in wetland hydrology and water quality. The water quantity and water quality effects of the proposed action are addressed in **Section 3.2.2** of this EIS. Briefly, the hydrologic/water quantity effects of the project would be positive, and the water quality effects are generally expected to be positive or neutral. Providing improved drainage for the project site is one of the key objectives for the proposed action, and is necessary to the success of both the sports field and wetland/habitat components of the project. Moreover, the drainage features of the proposed action have been integrated into the design of the wetland/habitat component, because it is critical that the drainage system provide water to the wetland/habitat complex in suitable quantities at appropriate times. It is also critical that the water supply to the wetlands be of sufficient quality to support the desired biota. In short, the proposed project has been designed to meet the water quantity and quality needs of a functioning wetland system. Therefore, assuming the project functions as planned, the proposed action would have beneficial (rather than adverse) indirect impacts on wetlands.

Research suggests there is an uncertain potential for water quality effects in areas subjected to artificial lighting, due to the behavior of zooplankton (microscopic aquatic animals). Zooplankton have been shown to avoid migrating near the surface of freshwater lakes in urban areas due to sky glow from artificial lighting (Moore, pers.com.). If light sources adversely influence zooplankton that feed on algae, increased algal mass could result, which if significant, could cause lower dissolved oxygen in the water column. Algae blooms and lower dissolved oxygen can have negative repercussions up the food chain for other aquatic invertebrates, fish, and amphibians, as well as wetland plants. However this information is specifically applicable to zooplankton in lakes, not in shallow vegetated wetlands, so it is not possible to conclude that the proposed sports field lights would or would not have adverse affects on zooplankton and the resulting food chain associated with vegetated marshes. Regional experts in the field indicated that studies of zooplankton and algae growth in wetlands would be needed to determine the potential effects of sports field lights on aquatic food chains (Moore, pers.com.). It should be noted, however, that Sand Point Magnuson Park is located within a large metropolitan area and therefore is already subject to skyglow, and it would not be possible to measure the incremental change in skyglow caused by the proposed action (see **Section 3.9.2** for additional discussion).

Human Disturbance Effects

Other common types of indirect impacts of development actions on plant communities generally stem from one or more forms of human disturbance of those communities. Two aspects of the proposed action would provide the potential for human disturbance effects on plant communities: (1) an increase in overall human use of the project site in response to increased capacity and expanded opportunities for park activities and (2) the influence of the lighting systems that would serve 11 of the proposed sports fields.

Increased Human Use

The number of recreational visitors to the project site and the total annual hours of on-site recreational use would increase dramatically with the proposed action, primarily in conjunction with the major capacity expansion represented by the sports field complex. The existing sports fields at Sand Point Magnuson Park were used a total of approximately 3,700 hours during calendar year 2000. The Department of Parks and Recreation does not have specific future projections of field use hours or participant occasions with the proposed fields completed and in operation. The proposed sports fields would provide the capacity to support over 20,000 hours of field use, however, suggesting that future sports field use would likely be several times larger than the current numbers. (See **Section 3.10 Recreation** for additional discussion.)

The large relative increase in sports field capacity and expected use cannot be interpreted to indicate a corresponding level of increase in human disturbance effects on plant communities. The mere presence of large numbers of people in the sports field area would not automatically translate into large numbers of those visitors entering the wetland/habitat complex. Sports field users would be on the project site for a specific purpose (a scheduled game or practice) at a specific location at a scheduled time; their recreational trips to the site would not be characteristic of a family outing to a regional park that would encompass several different activities using multiple park settings. In addition, much of the sports field activity would occur during evening hours when the synthetic-turf fields were lit for night play. The trails through the wetland/habitat complex would not be lit, so there would be minimal byproduct use of the wetland/habitat complex by sports field users during the after-dark component of sports field activity. Overall, sports field users would have a relatively small propensity to visit the wetland/habitat complex in conjunction with visits to the sports field complex.

Aside from increased future use of the project site associated with the sports fields, completion of the proposed project would likely generate increased use specifically oriented to the wetland/habitat complex. This component of the project would represent a large increase in available opportunities for passive-appreciative recreational activities such as wildlife observation, nature interpretation, environmental education, and simply walking or hiking in natural settings. These opportunities would increase the attraction of Sand Point Magnuson Park for a large segment of the recreational public that participates in these activities, and would prompt many people to come to the park specifically to visit the wetland/habitat complex, or to visit the wetland/habitat complex as a secondary activity in conjunction with use of the beach area, boat launch or other resources in the park. A primary objective of the proposed project is to provide a resource base for formal environmental education programs centered on the wetland/habitat complex; implementation of these programs would generate another substantial visitor stream to the wetland/habitat complex. Considering all pertinent aspects of user, trip and resource

characteristics, nature-oriented recreational visitors and environmental education participants would likely account for the predominant share of future users of the wetland/habitat complex.

While there is a high probability that the wetland/habitat complex would receive a substantial volume of public use, it does not necessarily follow that the expected level of use would produce significant indirect impacts on plant communities in the wetland/habitat complex. The simple presence of humans does not automatically translate into adverse consequences for plant communities (note that this observation does not apply uniformly for wildlife species, as discussed in **Section 3.4.1.2**). The primary mechanisms for indirect human disturbance impacts on plant communities are actions such as trampling, littering and accidental (or deliberate) fires. For wetland/habitat complex visitors to create such impacts, they would need to engage in anti-social behavior that would be actively and passively discouraged by project design elements and park management. Trails and viewing sites would provide visitors with ample opportunities to experience the wetland/habitat complex without venturing off-trail into the interior of the complex. Informational handouts and signage would encourage visitors to remain in approved locations, and fencing in strategic locations would block off-trail access to more sensitive habitats. Park management staff, citizen volunteers and organized user groups would, to varying degrees, help to monitor user behavior and reinforce communication about proper use and care of the resource. On balance, there is reason to believe that the vast majority of visitors to the wetland/habitat complex would behave responsibly, and there would not be significant adverse human disturbance impacts on the plant communities in that complex.

Lighting System Use

The proposed action includes the installation of artificial lighting systems at the 11 sports fields with synthetic turf (Fields 5 through 15). Lighting system physical characteristics are described in detail in **Section 2.2.9**, their operation is summarized in **Section 2.2.13**, and most aspects of potential light and glare impacts are addressed in **Section 3.9**. The sports field lights could be used up to about 7 hours per day, and the soccer/rugby field lights are expected to be in use up to approximately 1,000 hours per year. The lighted fields closest to the wetland/habitat complex (Fields 6, 9, 10, 13 and 15) would use full-cutoff technology, which minimizes glare, spill light and sky glow that escapes from the fixtures and the illuminated area. Nevertheless, some unintended illumination would extend beyond the playing field area toward the adjacent wetland/habitat complex. Spill light with an illuminance level of 1 foot-candle would extend for a lateral distance of approximately 135 feet beyond the fencelines of these fields, while the illuminance level would decline to 0.2 foot-candle at a distance of approximately 205 feet beyond the fenceline. (For comparison, the design illuminance levels on the playing field surfaces range from 20 to 30 foot-candles). In most locations, this 205-foot zone would overlap developed features such as the cross-country trail, the habitat area restroom and education annex, the basketball courts and park/lawn planting areas. To the east of Field 9, however, the 0.2-foot-candle level extends into the westernmost tier of the proposed marsh ponds at the edge of the wetland/habitat complex. Consequently, the sports field lighting systems would produce a dim level of artificial light for a few hours at a time on a regular basis in a small band of the proposed wetland area.

A number of review comments on the Draft EIS expressed concern over the effects of the proposed sports field lighting on the wetland/habitat complex, including comments that specifically maintained there could be adverse effects on vegetation in the complex. In response to these comments, the Department of Parks and Recreation directed the EIS preparers to investigate this issue in additional detail. That

investigation identified no published research on the effects of artificial light on wetland vegetation, and the lack of such specific documentation was confirmed by Longcore and Rich (2001).

In general, both artificial and natural light trigger activities such as leaf and stem growth, timing of flowering, fruit development, leaf loss, and other processes in plants (Briggs 2002). Lab experiments showed reductions in germination rates of mountain hemlock seeds when exposed to artificial light at night (Edwards and El-Kassaby 1996). Anecdotal evidence from outdoor situations suggests that plants may respond to all-night artificial light, such as street lamps. For example, deciduous trees situated near streetlights have been reported to retain their leaves over the winter, presumably because the trees perceive a longer day (Briggs 2002). Lengthening days artificially with sports field lights might have the potential to affect plants, although some researchers have concluded that the intensity of most artificial light sources would be too low to affect wild plants (Health Council of the Netherlands 2000). Street lights produce a typical maximum lighting level (on the surface directly below the fixture) of about 5 foot-candles, which is much higher than the spill light that could escape from the sports fields into the western margin of the wetland/habitat complex. Because of differences in mounting heights, lighting intensity levels at various distances and typical hours of operation, it is not possible to extrapolate the research findings based on streetlights to the proposed sports field lights.

Based on the lack of research to the contrary and the limited intensity and extent of artificial illumination away from the proposed sports fields, it is unlikely that the sports field lights would have a perceptible effect on the actual plant communities within the wetland/habitat complex.. Some scoping and Draft EIS review comments for this EIS identified issues relating to the ability of wetland and/or upland areas nearest the sports fields to provide highly functioning wildlife habitat. Because these issues involve the wildlife using these areas rather than the plant communities in the habitat areas, the potential effects of field lighting on wildlife are discussed in **Section 3.4Animals and Fish**.

3.3.2.4 Effects on Wetland Functions

Table 3.3-2 provides a summary of the anticipated wetland functions for the existing conditions on the project site and for the proposed action. To facilitate comparisons among the alternatives, wetland function ratings for the lesser-capacity alternative are also included in the table. As described in **Section 3.1.1.4**, the tool used to estimate wetland functions for the site is the modified Reppart or SAM (Semi-quantitative Assessment Method) functional assessment (Cooke, 2000). Completed data forms are provided in **Appendix C** (see Exhibits C1 through C3 for the existing conditions, and Exhibits C4 through C7 for conditions with the proposed action and lesser-capacity alternative). The wetland functional assessment has been conducted on assumed conditions 30 years in the future (to provide a relative 'equivalency' between the age of existing trees on the site and proposed wooded areas in the future). Typical wetland patch sizes were assumed to be larger in the future for both alternatives, based on proposed increases in available water and proposed site reconfiguration. Therefore, patch sizes were assumed to be 2 acres for the wet meadow/emergent communities, 3 acres for the shrub community, 1 acre for the forested communities, and 2 acres for the open-water/emergent communities. **Table 3.3-2** summarizes the findings of the functions provided for each wetland vegetation type assessed. The numbered rating for each category has been converted to a high, moderate, or low rating.

Table 3.3-2
Anticipated Wetland Functions by Alternative

Wetland Function	Emergent Wetland			Shrub Wetland			Forested Wetland			Open Water Emergent	
	Existing	Proposed	Lesser	Existing	Proposed	Lesser	Existing	Proposed	Lesser	Proposed	Lesser
Flood/Storm Water Control	L (6)	M (8)	M (8)	L (6)	M (8)	M (8)	M (8)	M (10)	M (10)	M (11)	M (11)
Base Flow/Ground Water Support	L (7)	M (10)	M (10)	L (7)	M (8)	M (8)	L (7)	L (7)	L (7)	M (10)	M (10)
Erosion/Shoreline Protection	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Quality Improvement	M (9)	M (9)	M (9)	M (9)	M (10)	M (10)	M (9)	M (10)	M (10)	M (8)	M (8)
Natural Biological Support	M (19)	H (30)	H (30)	M (19)	M (26)	M (26)	M (20)	M (26)	M (26)	H (28)	H (28)
Overall Habitat Functions	M (5)	M (6)	M (6)	M (5)	M (6)	M (6)	M (5)	M (6)	M (6)	M (9)	M (9)
Specific Habitat Functions	L (5)	H (14)	H (14)	L (4)	L (6)	L (6)	L (4)	L (7)	L (7)	M (9)	M (9)
Cultural/Socioeconomic Functions	L (10)	M (14)	M (14)	L (10)	M (14)	M (14)	L (10)	M (14)	M (14)	M (14)	M (14)

For the proposed emergent wetlands, including the marshy flow-through pools on the west side of the wetland/habitat complex, it is estimated that natural biologic and specific habitat functions would increase the most under the proposed action or the lesser-capacity alternative. This assumed increase in function is due to the lengthening of the season of inundation, the increase in species diversity (vegetation), and the assumption that much of the emergent habitat would be closely associated with shrub and open-water or aquatic-bed communities in future conditions. Flood storage, water quality improvement and overall habitat functions were not assumed to increase significantly using this assessment method.

For the proposed shrub communities, including the shrubby margins of the marshy pools, the edges of the permanent open-water wetlands and wet shrub thickets in the interior of the habitat zone, the estimated functions did increase as much as is anticipated for the emergent wetlands, although modest increases were predicted in flood control and natural biologic support.

For the proposed forested wetlands, including margins of the marshy pools, edges of the lagoon and open-water wetlands, and in the interior zones of the habitat areas, the greatest functional increase would be in cultural/socioeconomic function, although most functions would see a slight to modest increase (except base flow, which would remain constant). This assumption of function, in future conditions, is somewhat misleading in that it does not reflect what the site could become with the specific intent to create habitat complexity, mixed age-class forest and species diversity. Under the no action alternative, however, similar gains might be realized under the guidance of the Sand Point Vegetation Management Plan.

The open-water/emergent wetland communities, which are characterized by the year-long presence of surface water with aquatic bed, emergent, and fringing shrub/forest habitat, do not currently exist on the site; therefore, all increases in the presence of that community type represent net gains in the functions that community type provides. Of particular note should be the function for natural biological support, which is assumed to be the highest of any community present or anticipated on the site. This community type would be present in the Promontory Point ponds, the lagoon, and the seasonal long-term wetlands northwest of the lagoon.

Using such a function assessment tool is often subjective, as one has to assume future conditions relative to success of design and implementation. The most frequent failing of designed wetland compensations is the lack of water for durations long enough to assure sufficient saturation. Given the existing conditions on the project site and the proposal to create engineered “collection and conveyance” systems for the stormwater emanating from the fields to the west, it can be assumed that adequate hydrology would be provided to these designed wetland habitats to assure the long-duration inundation necessary for creating effective wetland habitat.

In addition, the proposed action would create year-round, open-water habitats with emergent margins, aquatic bed, and fringing forests and shrub communities. Upland forests linking the wetland systems to the Lake Washington shoreline and the forests of Promontory Point would buffer the new open-water habitats. This combination of habitat features would assure the creation of diverse habitat types, linked across the landscape and buffered by upland forests, to fill the life-history needs of a broad range of aquatic and terrestrial species.

The opportunity for public access to wetlands, with passive and formal education opportunities, would be significantly increased with either alternative, as trails, overlooks, and interpretive elements are included

in the project plans. Educational opportunities would still be provided in the no action alternative, although the habitats would be less physically accessible and more at risk from human disturbance.

3.3.3 Impacts of the Alternatives

3.3.3.1 Lesser-Capacity Alternative

The lesser-capacity alternative would have the same types of impacts on plant communities as those described in **Section 3.3.2** for the proposed action. Some of the impacts would likely vary somewhat in intensity and extent based on differences in project plans between the alternatives.

Figure 3.3-3 identifies the existing habitat areas that would be displaced by developed features under the lesser-capacity alternative. The short-term impacts from construction of the lesser-capacity alternative would likely include removal of the existing vegetation on approximately 50 to 65 percent of the project site. The total area of construction activity for the lesser-capacity alternative would be somewhat less than for the proposed action, because the existing tennis courts, parking lot and access road in the interior of the project site would remain, but this area is not currently vegetated. In addition, the area to be occupied by Field 6 in the proposed action would not be disturbed for sports field development under the lesser-capacity alternative, and would remain vegetated. Nevertheless, this shifting of Field 6 (and Field 5) to the west would result in the elimination of 0.4 acres of upland forest and 0.3 (gross area) acres of wet meadow. On a long-term basis, the developed park uses include in the lesser-capacity alternative would likewise displace a relatively small area of existing vegetation that currently functions as habitat. One difference between the two action alternatives concerns the Kite Hill/Beach Drive parking area, which would not be expanded under the lesser-capacity alternative; consequently, a small area of existing savannah at this location would not be displaced.

The lesser-capacity alternative would result in approximately 4.8 acres (gross area)of direct wetland impacts to wet meadow habitats on the west side of the project site, in the area that would be developed for sports fields and upland planting. This is 4.5 acres less area of wet meadow impact than the proposed action, primarily because Field 9 (which would displace wet meadow area in the proposed action) is not included in the lesser-capacity alternative. Elimination of existing structures and related impervious surface area elsewhere on the project site would allow the creation of over 7 acres of wetland vegetation communities and upland planting. Existing wet meadow habitats that would remain under this alternative would be designed to become mixed-canopy wetland forest over time, with black cottonwood, red alder, willow and red cedar canopy.

Even with the loss of wet meadow habitat in the sports field area, the lesser-capacity alternative would result in a net increase of 9.7 acres of wetland habitat compared to the existing condition. This alternative would yield a somewhat larger increase (1.2 acres) in wetland habitat relative to the proposed action. There would be 1.9acre more wet meadow habitat in the interior portions of the wetland/habitat complex, 0.2 acre less area of water quality ponds, and approximately 0.5 acre less area of pond with fringing emergent vegetation. The overall size of the wetland/habitat complex for the lesser-capacity alternative is 61.6 acres. This figure is 3.5 acres less than for the proposed action, but represents an increase of 7.5 acres of functioning habitat compared to the existing condition.

Figure 3.3-3
Existing Habitat Displaced by Development, Lesser-Capacity Alternative

With respect to long-term indirect impacts, the lesser capacity alternative would likely have essentially the same water quantity and water quality characteristics as the proposed action. Because of the integral nature of the site drainage improvements relative to the wetland/habitat complex, the lesser-capacity alternative would have beneficial indirect water-related impacts on wetlands. The lesser-capacity alternative would produce a smaller, but still substantial increase in human use of the site. Because the existing road, parking lot and tennis courts south of the sports meadow would be retained with the lesser-capacity alternative, these features would generate more human activity near the central core of the wetland/habitat complex and might help promote "short cut" circulation patterns by park users. If this occurred, there is some potential for diminished success of sensitive plant communities. As was concluded for the proposed action, however, significant overall adverse indirect effects on plant communities associated with increased human use would not be expected.

The revised configuration of the lesser-capacity alternative includes fewer illuminated sports fields (3, compared to 11 for the proposed action); therefore the potential extent of artificial lighting in the area adjacent to the wetland/habitat complex would be considerably reduced. This alternative no longer includes Field 9, which (under the proposed action) would cast a dim light onto a sliver of the marshy flow-through pool area at the western edge of the habitat complex. In addition, the only lighted fields under the lesser-capacity alternative would be located along the western side of the sports field complex, adjacent to Sportsfield Drive. Consequently, the 0.2-foot-candle limit for these fields would cut across the adjacent unlighted fields and would approach within no more than about 200 feet of the edge of the wetland/habitat complex. Based on the revised lighting characteristics of the lesser-capacity alternative and the previous discussion of potential lighting effects, under this alternative the light from the sports fields would not be likely to have a perceptible effect on the plant communities within the wetland/habitat complex. Potential effects of lights on nocturnal wildlife species and migratory birds that might use these habitats are discussed in **Section 3.4.1 Wildlife**.

The expected effects of the lesser-capacity alternative on wetland functions would be similar to those previously reviewed in **Section 3.3.2.4**. As indicated in **Table 3.3-2**, the same wetland function ratings were assigned to the lesser-capacity alternative and the proposed action. The lesser-capacity design does not include collection and direction of flows from the natural-turf sports meadow fields at the north end of the project site toward the sedge-meadow wetland at the south toe of Kite Hill. In this case there would be no change to the hydrology of that sedge meadow (therefore it would remain a mixed sedge/spirea wetland), and there would be a smaller volume of water flowing into the seasonal marshes just northwest of the lagoon. Less water flowing into those upper marshes would mean that they would be inundated later in the fall and likely begin to drop water elevations earlier in the spring, compared to the proposed action. This would shift the habitat types provided (because of the shift in seasonal hydroperiod), but would not result in the wetland areas being smaller.

3.3.3.2 No Action Alternative

With no action, vegetation communities within the habitat portion of the project site would be expected to mature and develop through expected natural successional stages. With the implementation of the adopted Vegetation Management Plan (VMP) for Sand Point Magnuson Park, the presence and extent of non-native invasive species such as Lombardy poplar, Scot's broom and Himalayan blackberry would be reduced over time within the interior portions of the Park and the project site. Perhaps invasive species

such as English ivy, virgin's bower (clematis), and Japanese knotweed would also be eliminated along the margins and interior portions of the woodland of Promontory Point.

Native black cottonwoods would be expected to slowly expand their presence throughout the interior portions of the habitat areas linking across the site. The extreme soil conditions on the site would make that colonization a slow process. Native shrubs would also likely become established, as the VMP requires replacing the Lombardy and non-native shrub thickets with an equivalent stem density of native trees and shrubs, including conifers. The requirements of the VMP to maintain some portions of the habitat zones as meadow would assure that some aspects of the open savannah vistas of the interior habitat area would be maintained. Plant species recommended for use in the habitat restoration areas are discussed in detail in the Sand Point Magnuson Park Vegetation Management Plan (December, 2001) which was adopted after the Draft EIS was published. A complete list of proposed species and the criteria used to determine siting locations are provided in **Appendix C** of this Final EIS.

The wetland habitats present in the interior portions of the site would also proceed through successional changes under the no action alternative. The existing wetlands on the site already exhibit the expected pattern of vegetation community succession: the long-term inundated marshes all have a margining fringe of native woody shrubs and saplings. Over time, those saplings would increase in size, thereby increasing evapotranspiration and reducing the duration of inundation in the wetland areas. These areas would continue to function as wetlands, due to the underlying topography, although the specific functions that they provide would shift over time.

3.3.4 Cumulative Impacts

Urban and agricultural development around the shores of Lake Washington, in the City of Seattle, and within the surrounding region has created long-term loss of natural vegetation in both upland and wetland areas, representing significant adverse cumulative impacts. Implementation of the proposed action would result in a net increase in the acreage of upland and wetland plant communities with desired natural characteristics on the project site. This increase would run counter to and help (in an admittedly small way) to offset the long-term trend of diminished natural vegetation and wetland acreage in the local area and the surrounding region. At a more localized scale, the proposed project would effectively reverse a substantial portion of the historical loss of wetlands and native vegetation on the Sand Point peninsula. Therefore, with respect to physical changes to functioning plant communities, the proposed action does not have the potential for adverse cumulative impacts.

Development of the sports fields (primarily) and the wetland/habitat complex (to a lesser degree) included in the proposed action would both promote increased public use of the project site and Sand Point Magnuson Park as a whole. The increased opportunities for nature-based recreational and educational activities at the park, and the resultant increase in public awareness of those opportunities, would probably be the most significant source of increased public use in the expanded habitat areas within the park. Other pending and planned actions at Sand Point Magnuson Park (see **Section 2.6** for descriptions) would likewise contribute somewhat to increased overall park visitation. All or most of the use associated with these projects would be directed toward other areas of the park, such as the Off-leash Area and the North Shore Recreation Area, and would contribute little to use of the wetland/habitat complex. In any event, the potential public use of the wetland/habitat complex is not expected to result in

adverse human disturbance impacts to the plant communities in the complex, and would not be likely to create or contribute to such disturbance impacts on a cumulative basis.

3.3.5 Mitigation Measures

The proposed action and the lesser-capacity alternative would result in the direct fill of existing wetlands, and thereby be subject to appropriate City, State and Federal wetland and water quality permit conditions. Given the anticipated volume and footprint of wetland fill, it is likely that the proposed action would trigger the need for an Individual Permit from the Corps of Engineers under the purview of Section 404 of the Clean Water Act, and a Section 401Water Quality permit from Ecology. Triggering a Federal permit would also likely create the need to comply with requirements of the Endangered Species Act, relative to Puget Sound chinook salmon and bull trout.

The regulatory requirements for wetland compensation on the proposed project are unknown in the absence of a project-specific permit application and subsequent discussions with resource and regulatory agencies. The existing wetlands on the project site are providing limited functions (due to their physical isolation from the lake and the lack of long-term inundation and habitat diversity), while the proposed action anticipates increases in wetland acreage, wetland functions, and linear shoreline area and accessible wetland habitats for aquatic species including fish and aquatic mammals. In addition, the proposed action and the lesser-capacity alternative both are designed to allow for substantial opportunity for passive and formal education on site. Given the existing conditions on site, the proposed action and lesser-capacity alternative might actually provide water quality benefits relative to the no action alternative. Regulatory agencies at every level consider all of these intricate variables when determining whether proposed wetland compensation is appropriate for anticipated losses.

The plans for the proposed action incorporate a number of features to mitigate for potential impacts that might otherwise occur. For example, the layout of the proposed sports fields has been configured so that the northern soccer fields (Field 5 and 6) would avoid direct impacts to an upland grove of young madrone trees that are present south of the Junior League Playground. This grove of madrone would not be protected in the revised configuration of the lesser-capacity alternative.

For both the proposed action and the lesser-capacity alternative, the sports fields have been laid out to avoid a 2.7-acre forested wetland present along the west edge of the mid-central portion of the habitat area. Both plans were modified from initial concepts in order to avoid this black cottonwood/Oregon ash wetland community. In addition, both action alternatives have been designed to preserve, as much as possible, the existing native tree and shrub stands throughout the main portion of the habitat area. In addition, for both action alternatives, all of the existing seasonally-inundated wetlands would be preserved, including the estimated extent of their contributing basins.

Compensation for the anticipated loss of 9.9 acres of wet meadow and willow/spirea shrub wetland habitat in the sports field area is proposed as follows:

- enhance wetland functions within the remaining wet meadow by regrading the area (which is estimated to be 40 percent wetlands in existing conditions) to assure a long duration of 12 to 18 inches of water throughout more than 50 to 60 percent of the area. This result would increase wetland functions within that area of the habitat zone, as described further below;

- create nearly 10 acres of permanent open-water/emergent/aquatic-bed wetland habitat that does not exist on the site;
- create an additional 10 acres of emergent marsh, with longer-term inundation than existing conditions;
- increase total wetland acreage for the proposed action by 8.5 acres over existing condition, and by 9.7 acres for the lesser-capacity alternative;
- create upland forest and shrub habitats surrounding the permanent open-water wetlands and the marshy pool complex on the west side of the project site, thereby increasing the survivability and viability of many populations of amphibian species;
- eliminate of over 11 acres of structures and impervious surface in the proposed action, or 7.8 acres in the lesser-capacity alternative, to become upland planting or wetland vegetation community;
- confine trails to the outer portions of the wetland/habitat complex, to avoid locating trails in the core habitat zone;
- use educational signage outlining the value of habitat and discouraging off-trail human activity in the habitat complex;
- pre-treat all surface water moving across the project site and into Lake Washington;
- preclude watercraft access within the interior of the lagoon from the landward or waterward side;
- temporarily or permanently fence certain portions of the wetland/habitat complex, to provide maximum habitat function for more elusive wildlife species;
- maintain on-site forest vegetation communities and link them across the site for increased habitat diversity, structural complexity, and summer shading of all open water zones;
- create linked upland forest/shrub habitat from the shoreline of the lake, into the interior habitat spaces, and southward to the existing forests of Promontory Point to assure linkage for terrestrial species and habitat niches for all life-history needs for a variety of wildlife species;
- install brush piles, downed woody debris, perches and snags throughout the entire habitat zone to provide for nesting, perching, and resting locations that are currently missing from the site;
- increase shallow shoreline by 5,180 linear feet at the Lake Washington Lagoon and 7,600 linear feet at the wetlands, and provide the same increase in vegetated shoreline with overhanging vegetation (which is very limited in existing conditions);
- create of a source of browse for aquatic mammal species along the shoreline and in the interior portions of the habitat zone; and
- create a barrier with no surface water connection between the proposed lagoon and the interior wetland habitats to preclude the easy invasion of mobile invasive species (bass, carp, and bull frogs).

Total wetland acreage on site would be increased by 8.5 acres for the proposed action and by 9.7 acres for the lesser-capacity alternative. In addition, the depth and duration of inundation for the wetlands on site would be increased (except for the existing closed depressions such as Frog Pond) over existing conditions, thereby providing for greater amphibian, invertebrate and wetland plant habitats.

Increases in plant species diversity would result in an increase in nesting and food sources for a variety of wildlife types (see **Section 3.4** below), thereby increasing overall biotic support on the site. In addition, the site drainage is being designed in such a manner that dissolved organics and nutrients would be transported off-site into the lake to the benefit of near-shore aquatic species.

Creation of the lagoon would provide deep-water, aquatic-bed, emergent-marsh and shrub habitat connected directly to the waters of Lake Washington. In addition, the 10,950 linear feet of new shoreline for the lagoon would be designed with a heterogeneous shoreline; parts would be vegetated marsh, parts would have deep margins with overhanging woody riparian vegetation, and parts would have unvegetated sloping gravelly beaches. The diversity of shoreline treatments along the convoluted margins of the lagoon would provide a broad range of niches for aquatic and terrestrial species. The lagoon is designed to have screening from the east, south, and west by forest cover that would eventually include a significant coniferous component to provide critical shading to assure water temperatures do not preclude use by targeted native species of fish.

3.3.6 Significant Unavoidable Adverse Impacts

Implementation of the proposed action would cause the unavoidable loss or conversion of some existing plant communities on the project site. Creation of the sports fields would result in the filling and elimination of 9.3 acres of existing wet meadow wetland habitat in the western portion of the project site. Although this habitat type is limited in the functions that it provides, this condition nevertheless represents a loss of a specific habitat type in that location. Nearly 4.5 acres of upland meadow and wetland meadow mosaic habitat present in the location of the proposed lagoon would be lost through excavation and replacement with lagoon habitat. Some stands of upland black cottonwood would be affected by relocating a section of Beach Drive, and by grading to create the lagoon. Over 4 acres of upland meadow, thickets of non-native and native saplings and shrubs would be lost from the interior of the existing habitat zone to create permanent open-water wetland mosaics along the proposed access road in both the proposed action and lesser-capacity alternative. Approximately 5 acres of wet meadow/upland meadow mosaic would be converted to marshy pool habitat on the western margins of the project area. While site-specific losses of existing habitat would occur with the project, the net effect of the project would be to increase the area of functioning wetland and upland vegetative communities on the project site. Therefore, the impacts of habitat conversion would be mitigated, and there would not be significant adverse unavoidable direct impacts to existing plant communities.

The proposed action would not likely create water quantity or quality changes that would result in significant adverse indirect impacts to wetlands. Development of 15 athletic fields, including 11 with night lighting, and the wetland/habitat complex would result in an unavoidable increase in human use and use intensity on the project site. With respect to plant communities in the wetland/habitat complex, however, probable significant adverse impacts associated with this increase in use have not been identified.